CLAIMS

What is claimed is:

1. An electrochemical cell, comprising:

(a) a container having an open end, a closed end and a sidewall;

(b) a first electrode located within said container, said first electrode defining a cavity having an interior surface;

(c) electrolyte located within said container and in contact with said first electrode;

(d) a separator forming a lining on the interior surface of the cavity defined by said first electrode, said separator comprising a free standing reinforced edge that extends beyond said first electrode toward the open end of said container, said reinforced edge comprises a reinforcing material that provides structural support to the free standing reinforced edge of said separator after the separator has absorbed said electrolyte;

(e) a second electrode located within the separator lined cavity, said separator forming an interface between said first and second electrodes; and

(f) a closure assembly secured to the open end of said container.

2. The electrochemical cell of claim 1 wherein said closure assembly comprises a low profile closure member.

3. The electrochemical cell of claim 1, wherein said separator comprises a first region located beyond the interface of said electrodes and below the closure assembly, and a second region located between the first and second electrodes, said first region comprises a reinforcing material, said second region does not comprise the reinforcing material incorporated into the first region.

4. The electrochemical cell of claim 1, wherein said reinforced edge is substantially parallel to the container's sidewall.

5. The electrochemical cell of claim 1 wherein said second electrode is a frangible gel comprising an aqueous solution of potassium hydroxide.

6. The electrochemical cell of claim 1 wherein said reinforced edge comprises a material selected from the group consisting of polyethylene, polypropylene, polyamides, paraffin, methyl cellulose and chitosan.

7. The electrochemical cell of claim 1 wherein said separator comprises a flexible porous film of nonwoven fibers having a first broad surface, a second broad surface located on the opposite side of the separator from the first broad surface, and a perimeter.

8. The electrochemical cell of claim 7 wherein said material coats the fibers in the reinforced edge thereby preventing absorption of the electrolyte by the coated portions of the fibers.

9. The electrochemical cell of claim 7 wherein said material permeates through the pores of said separator from said separator's first broad surface to said separator's second broad surface.

10. The electrochemical cell of claim 7 wherein only one of said separator's broad surfaces is partially coated with the material.

11. The electrochemical cell of claim 7 wherein both of said separator's broad surfaces are partially coated with said material.

12. The electrochemical cell of claim 1 wherein said separator is a tube having an open end, said tube formed by coiling said separator.

13. The electrochemical cell of claim 12 wherein said tubularly shaped separator is closed on one end.

14. The electrochemical cell of claim 1 wherein the reinforcing material covers less than twenty percent of the electrodes' interfacial surface area.

15. The electrochemical cell of claim 1 wherein the reinforcing material covers less than five percent of the electrodes' interfacial surface area.

16. The electrochemical cell of claim 1 wherein the reinforcing material covers less than one percent of the electrodes' interfacial surface area.

17. The electrochemical cell of claim 1 wherein the reinforced edge comprises a continuous coating of reinforcing material.

18. The electrochemical cell of claim 1 wherein the reinforced edge comprises a discontinuous coating of reinforcing material.

19. The electrochemical cell of claim 18 wherein said discontinuous coating comprises strips of reinforcing material.

20. The electrochemical cell of claim 1, wherein said separator comprises a first rectangularly shaped strip of separator material having a central region and two mutually parallel edges, both of said mutually parallel edges comprising a reinforcing material.

21. The electrochemical cell of claim 20, wherein the central region of said strip is located juxtapose the closed end of said container and said edges of said separator extend beyond said first electrode toward said closure assembly.

22. The electrochemical cell of claim 21, further comprising a second rectangularly shaped strip of separator material having a central region and two mutually parallel edges wherein both edges comprise a reinforcing material, said central region of said second strip located juxtapose the central region of said first strip and the edges of said second strip extend beyond said first electrode toward said closure assembly.

23. The electrochemical cell of claim 22, wherein said separator comprises two elongated rectangular strips positioned perpendicular to one another and crossing at their central regions thereby forming a tube having a closed end and an open end.

24. The electrochemical cell of claim 20, wherein said first strip is coiled to form a tube comprising a reinforced opening on one end and a reinforced sealed bottom on the opposite end.

25. An electrochemical cell, comprising:

(a) a tubularly shaped container having an open end, a closed end and a sidewall;

(b) a first electrode located within said container, said first electrode concentric with said container's sidewall and defining a circular cavity having an interior surface;

(c) electrolyte located within said container and in contact with said first electrode, said electrolyte comprising an aqueous solution of potassium hydroxide;

(d) a separator forming a lining on the interior surface of the cavity defined by said first electrode, said separator comprising a free standing reinforced edge that extends beyond said first electrode toward the open end of said container, said reinforced edge comprising a reinforcing material and remaining parallel to the sidewall of said container after absorption of said electrolyte by said separator;

(e) a frangible second electrode located within the separator lined cavity, said second electrode comprising zinc particles suspended in a gel, said separator forming an interface between said first and second electrodes; and

(f) a closure assembly secured to the open end of said container, said assembly comprising a closure member overlaying and sealing the open end of said container.

26. A process for manufacturing an electrochemical cell, comprising the steps of:

(a) providing a strip of separator;

(b) coating at least one edge of said separator strip with a reinforcing material;

(c) coiling the coated strip to form a tube comprising a noncoated portion and a coated reinforced edge defining an opening at one end of the tube;

(d) providing a container having an open end and comprising a first electrode defining a cavity therein;

(e) inserting the coiled tube into the cavity defined by the first electrode so that the noncoated portion contacts said first electrode and a coated edge of the tube extends beyond said first electrode toward the open end of said container;

(f) inserting a second electrode into the tube defined by the coiled separator; and

(g) closing said container by securing a closure assembly to the open end of said container.

27. The process of claim 26 wherein the reinforcing material provides structural support to said separator's reinforced edge.

28. The process of claim 26 wherein said second electrode comprises a frangible gel.

29. The process of claim 28 wherein said frangible gel comprises zinc particles and an aqueous electrolyte.

30. The process of claim 26 further comprising the step of disposing a quantity of electrolyte within the coiled tube.

31. The process of claim 26 wherein said separator comprises nonwoven fibers.

32. The process of claim 26 wherein said tube comprises two or more layers of separator.

33. The process of claim 26 wherein two edges of said separator strip are coated with said reinforcing material.

34. The process of claim 33 wherein said coated edges are parallel to one another.

35. A process for manufacturing an electrochemical cell, comprising the steps of:
(a)providing a strip of separator;
(b) coiling the strip to form a tube with at least one open end;
(c) coating the open end of the tube with a reinforcing material;

(d) providing a container having an open end, a closed end and a first electrode defining a cavity therein;

(e) inserting the coiled tube into the cavity defined by the first electrode so that the open end of the tube is in close proximity to the open end of the container and the opposite end of the tube is in close proximity to the closed end of the container;

(f) inserting a second electrode into the tube defined by the coiled separator; and

(g) closing said container by securing a closure assembly to the open end of said container.

36. The process of claim 35 wherein the open end of the tube is coated by dipping a portion of the tube into a reinforcing material.

37. The process of claim 35 wherein the open end of the tube is coated by spraying a portion of the tube with a reinforcing material.

38. The process of claim 35 further comprising the step of disposing electrolyte into the cavity defined by said first electrode.

39. The process of claim 35 wherein said second electrode comprises a frangible gel.

40. The process of claim 39 wherein said frangible gel comprises zinc particles and an aqueous electrolyte.

41. The process of claim 35 wherein said separator comprises nonwoven fibers.

42. The process of claim 35 wherein said tube comprises two or more layers of separator.

43. A process for manufacturing an electrochemical cell, comprising the steps of:

(a) providing a container having an open end, a closed end and a first electrode located within said container, said first electrode defining a cavity;

(b) providing a first rectangularly shaped strip of separator, said separator having two opposing edges coated with a reinforcing material;

(c) inserting said coated strip of separator into the cavity defined by said first electrode wherein the uncoated portion of said separator lines the cavity and said coated edges extend beyond said first electrode toward the open end of said container;

(d) inserting a second electrode into the separator lined cavity; and

(e) closing said container by securing a closure assembly to the open end of said container.

44. The process of claim 43 wherein said coated edges overlap one another thereby forming a continuous ring of coated separator material between said first electrode and the open end of said container.

45. The process of claim 43 further comprising the steps of ;

(f) providing a second rectangularly shaped strip of separator having two opposing edges; and

(g) inserting said second rectangularly shaped strip of separator into the cavity lined by said first separator prior to the insertion of said second electrode, said second separator positioned perpendicular to said first strip of separator and said opposing edges extend beyond said first electrode toward the open end of the container .

46. The process of claim 45, wherein two opposing edges of said second strip of separator are coated with a reinforcing material.